



Ecological Sustainability of the Gulf of Mexico: The Role of Science, Management and Activism

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Sustained Ecological Quality





What do we really manage?



People!





Increasing World Population

Only in recent history has humankind discovered the means with which to increase human lifespan and reduce infant mortality.

We have multiplied our numbers faster than ever before through the use of improved sanitation practices and an enhancement of modern medicines.

	2000	2010
World	6.1 billion	6.8 billion
USA	281 million	315 million
Mexico	101 million	113 million
Cuba	8 million	11 million



Coastal Population Increases

Coastal cities and communities, with their boundless economic opportunity and better quality of life, are viewed as preferred places to live, work, play, and retire. As a result, coastal areas are becoming increasingly populated.

The bulk of world population lives on or near coastlines. In 1998, half of the world population lived within 200 km (120 mi) of a coast.

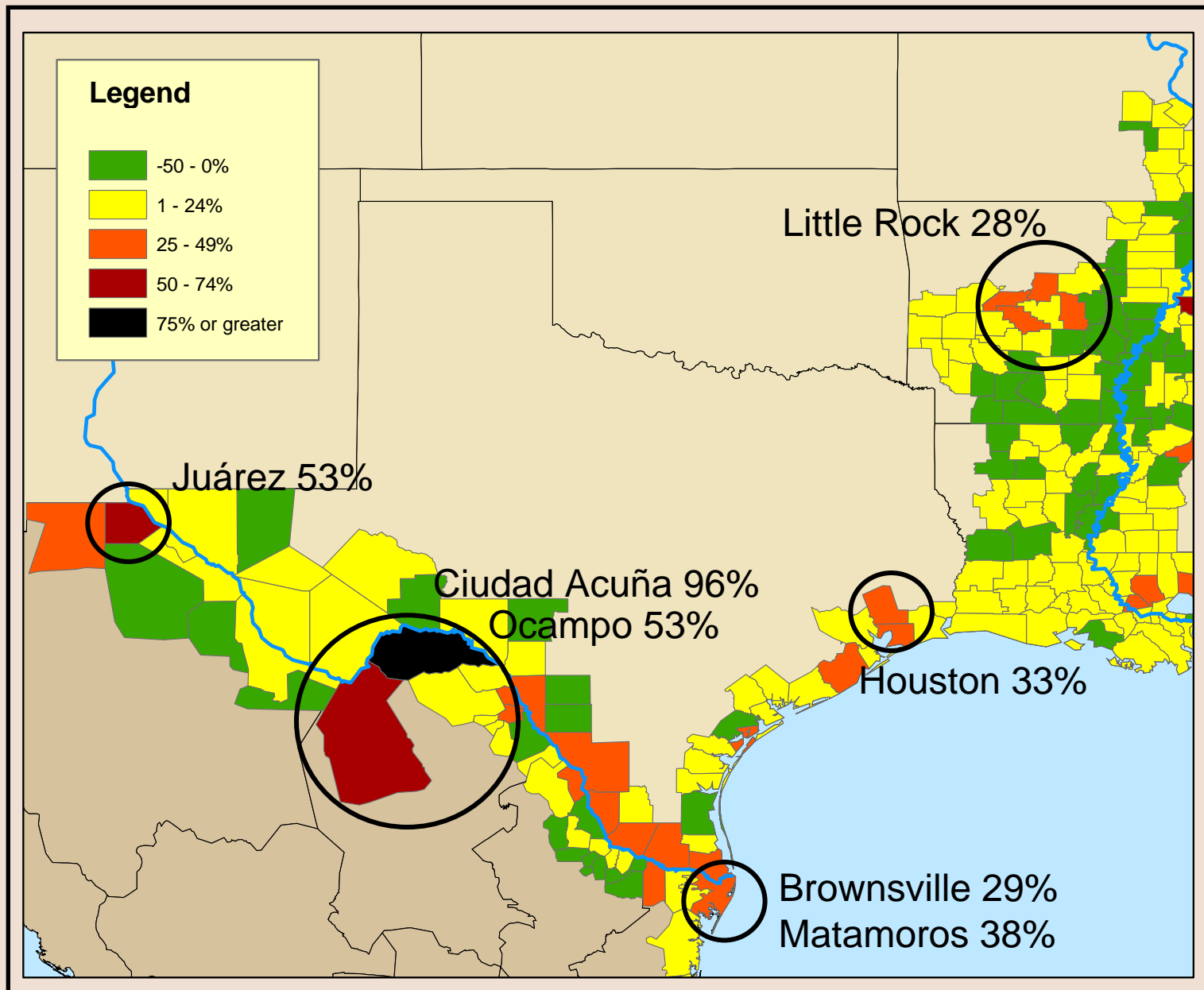
A large population shift occurred in the United States after World War II along coastlines as a result of industrialization and transformation of coastal cities into international centers of trade and commerce.



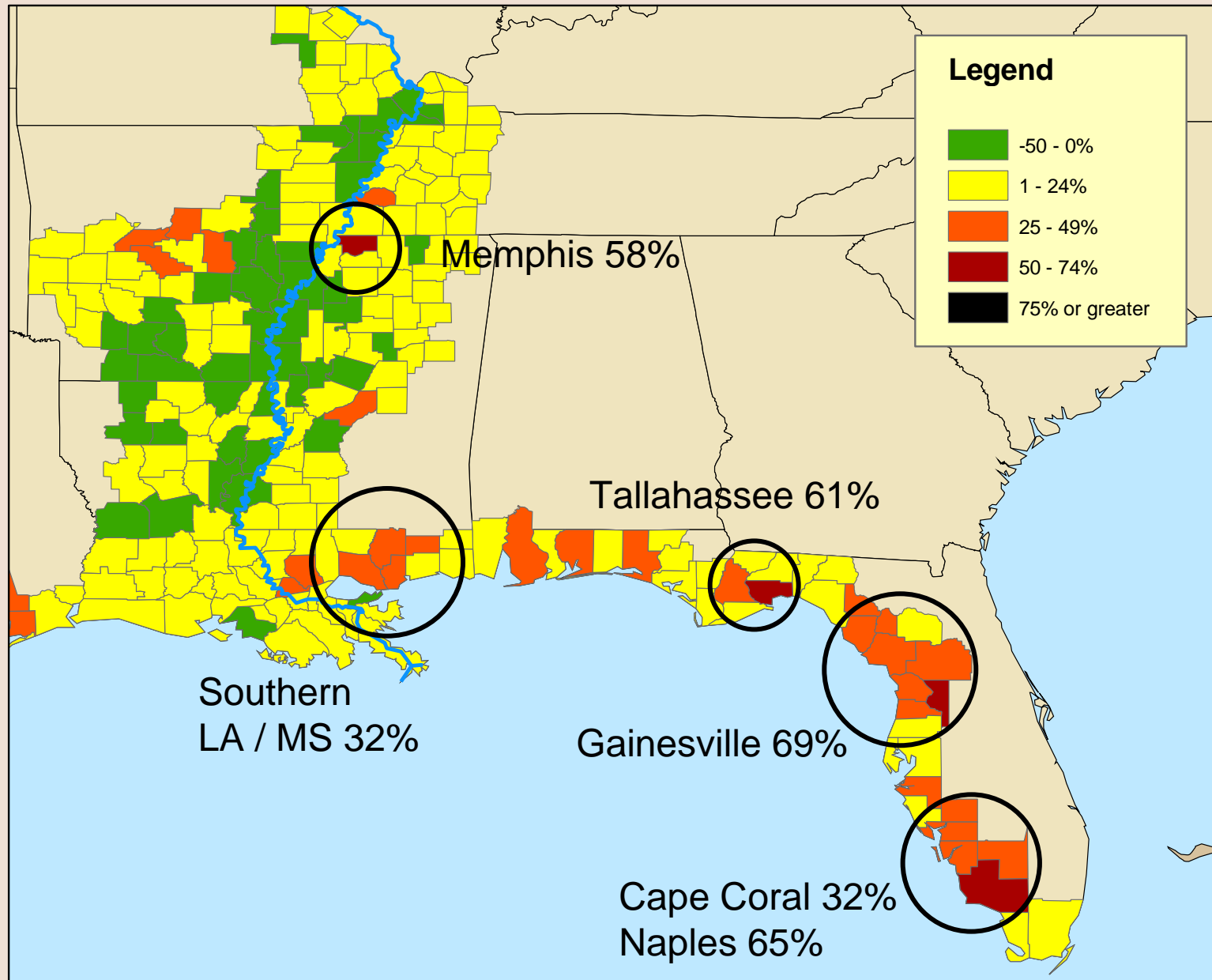
Gulf of Mexico (GOM) Populations

	USA	Mexico
Total Population	281 million	101 million
Total living in a GOM State	96 million (34 %)	19 million (19 %)
Total living in a GOM Coastal County	17 million (6 %)	10 million (10 %)

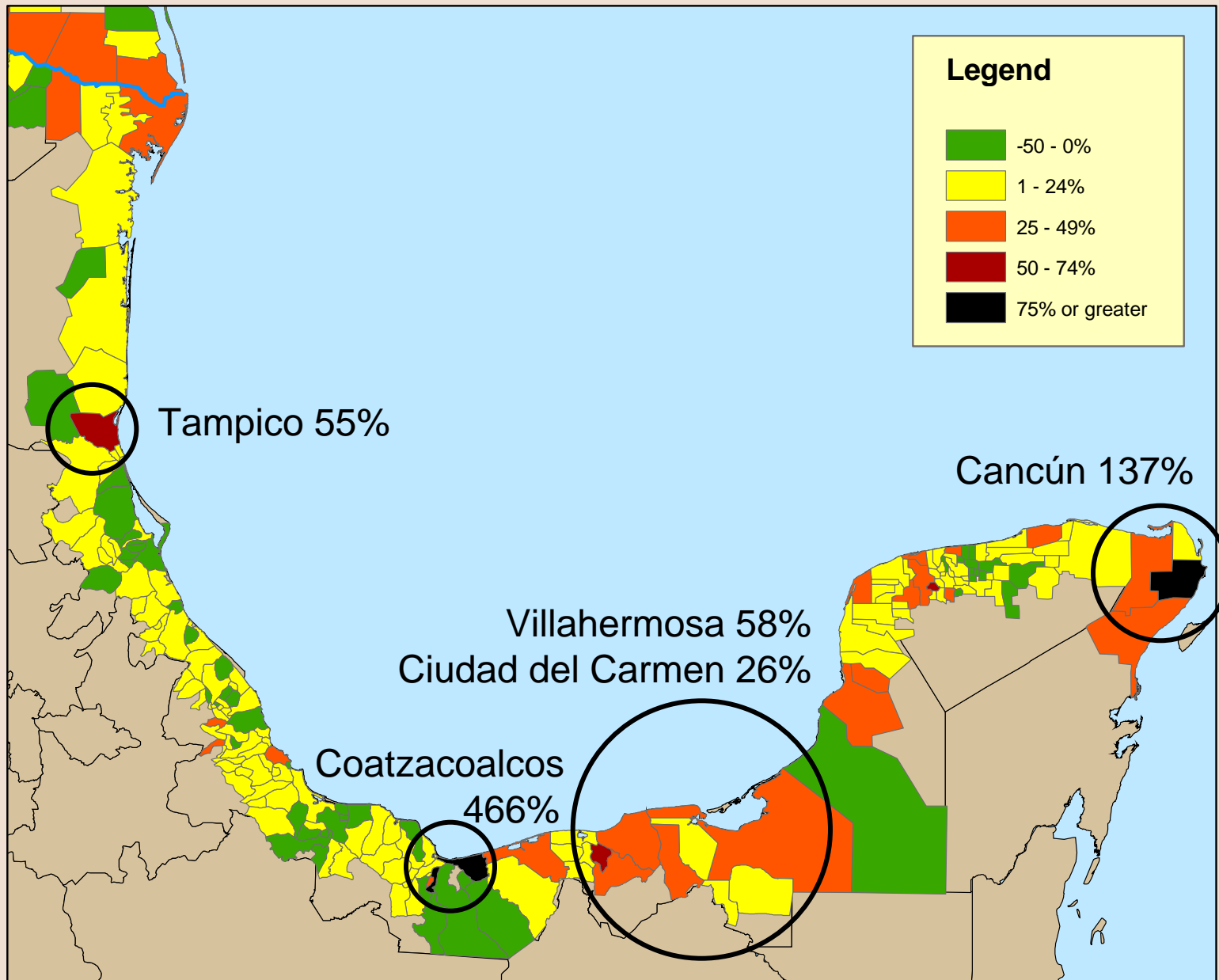
Percent Population Change West of the Mississippi River between the 1990 and 2000 National Census



Percent Population Change East of the Mississippi River between the 1990 and 2000 National Census



Percent Population Change in the Southern Gulf of Mexico Region between the 1990 and 2000 National Census



Brownsville, TX

Urban

Industrial

Forested

Shrubland

Grassland

Pasture

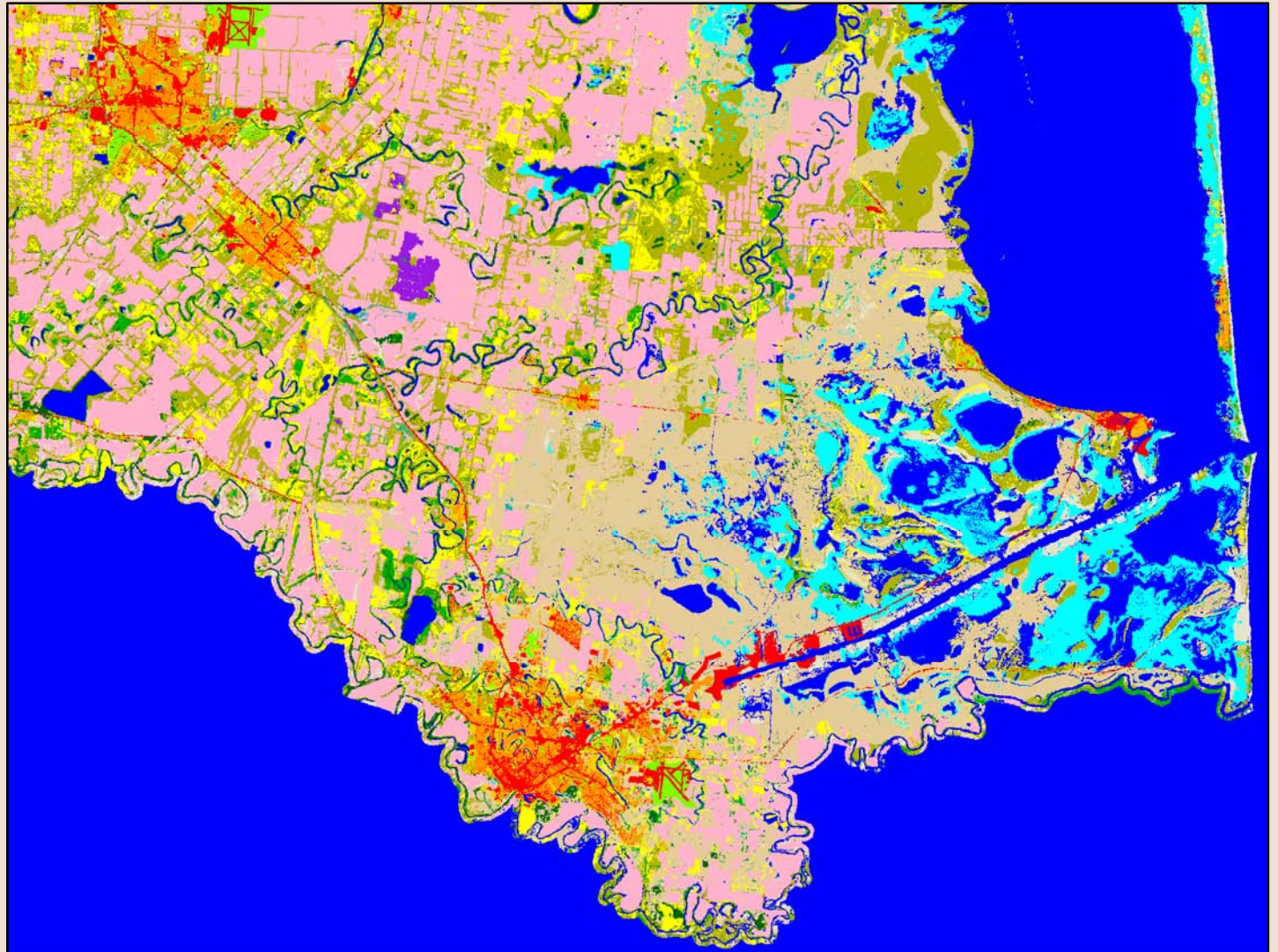
Row Crops

Wetlands

Woody

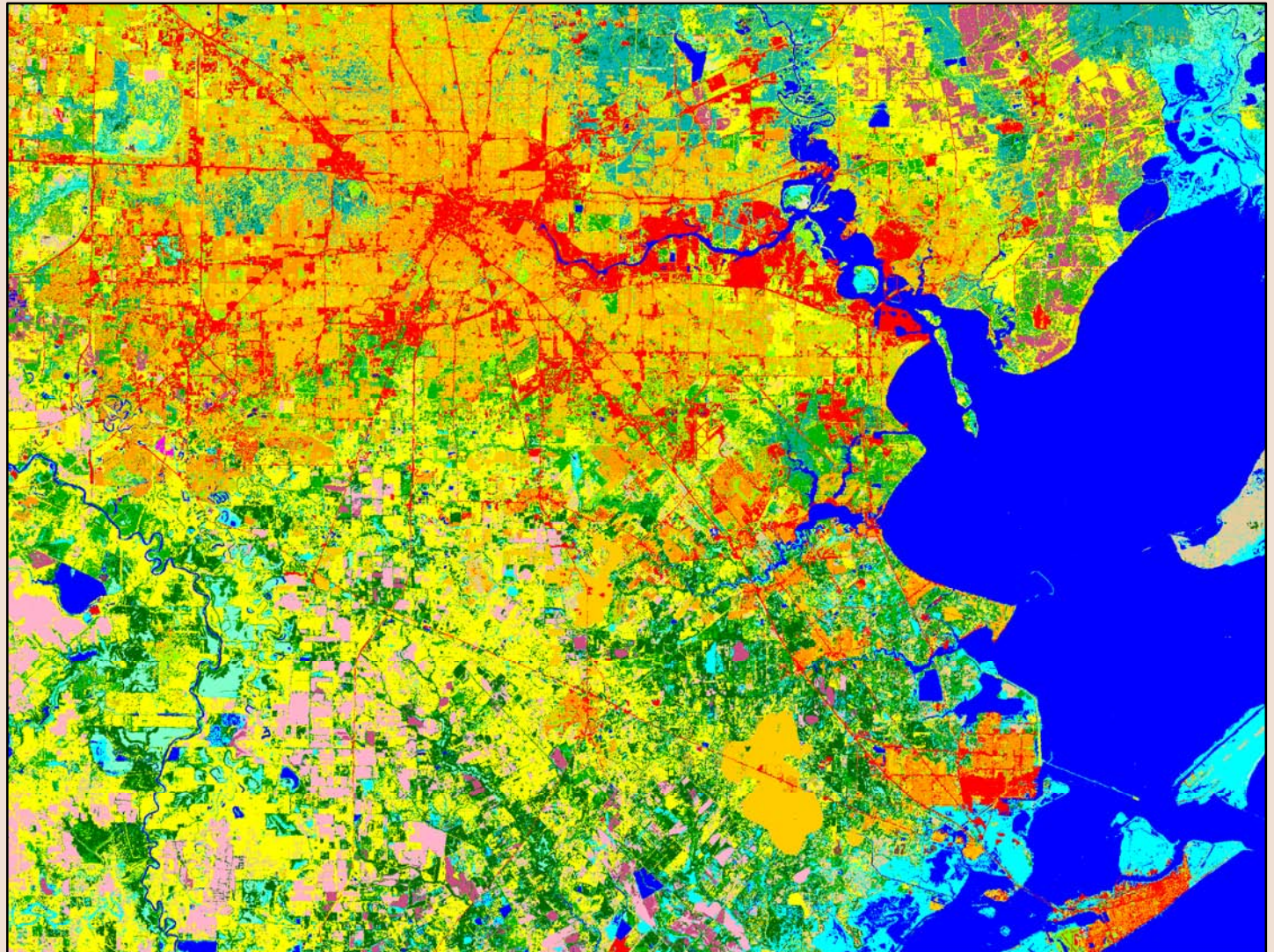
Wetlands

Water



0 3.5 7 14 21 Kilometers

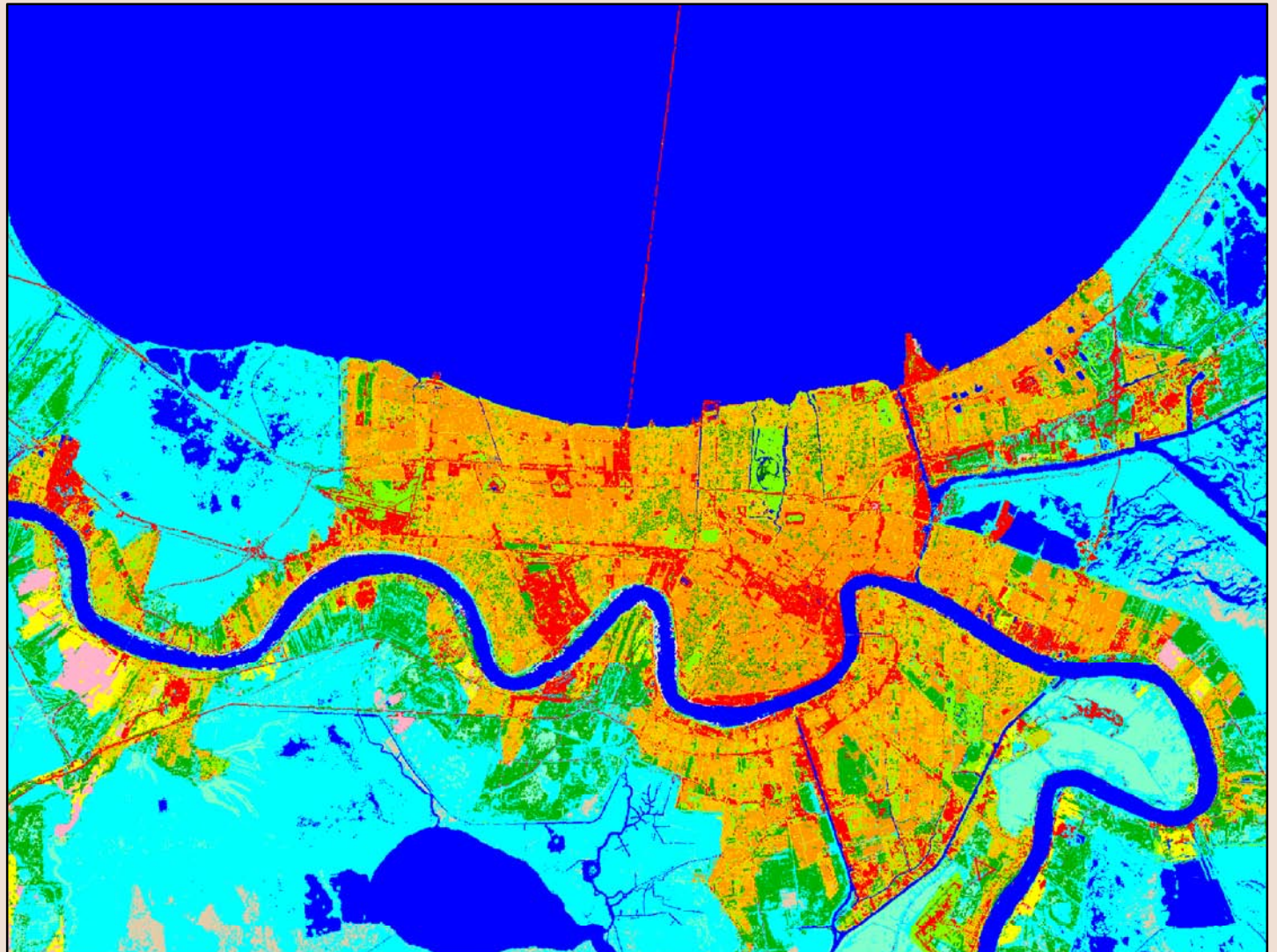
Houston / Galveston, TX



0 5 10 20 30 Kilometers

A scale bar indicating distances in kilometers. The bar is marked with 0, 5, 10, 20, and 30 kilometers.

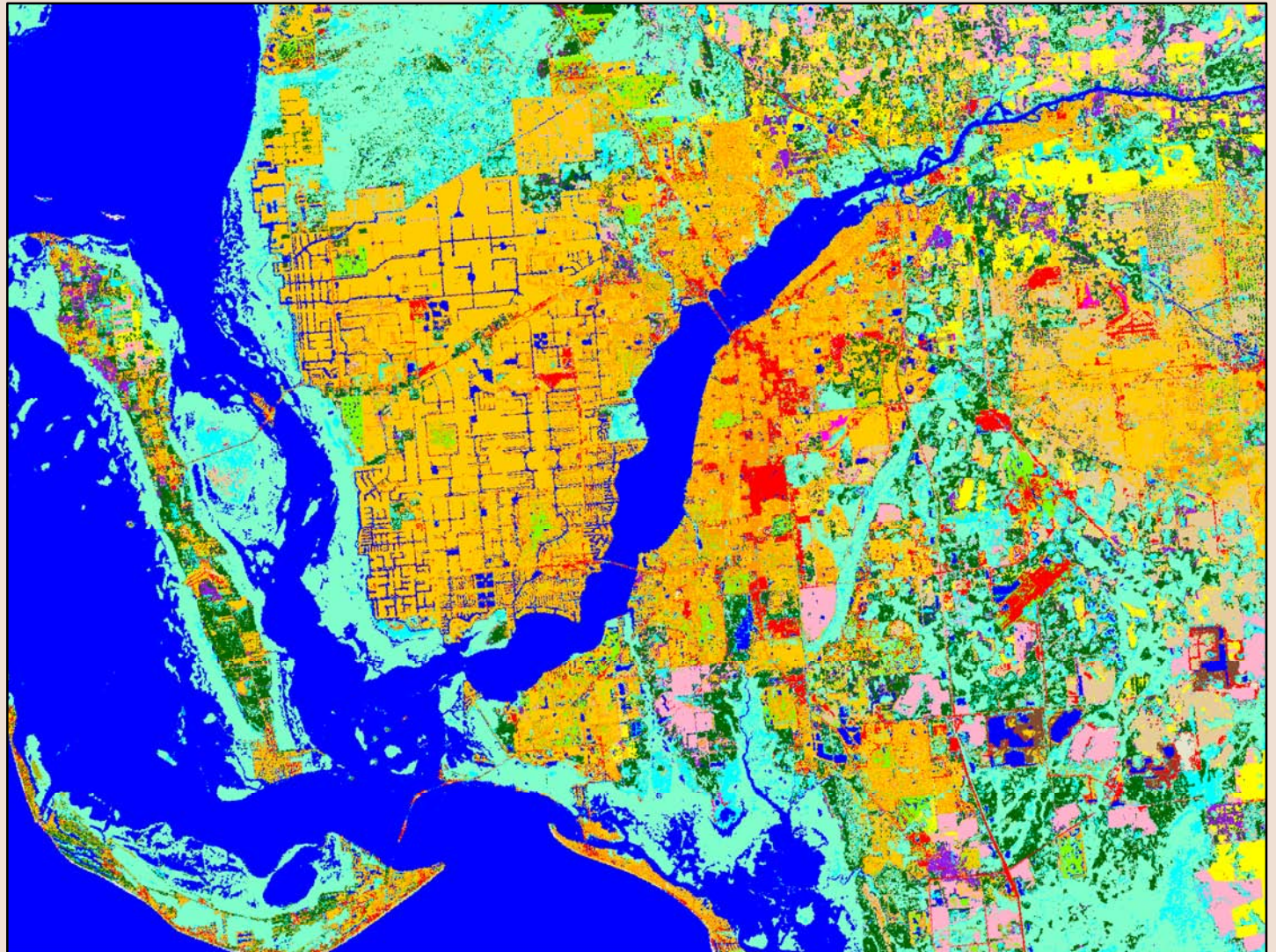
New Orleans, LA



0 3 6 12 18 Kilometers

A scale bar with tick marks at 0, 3, 6, 12, and 18 kilometers.

Cape Coral / Fort Myers, FL



0 3 6 12 18 Kilometers



A scale bar with tick marks at 0, 3, 6, 12, and 18 Kilometers. The bar is black and the text is black.

Key West, FL

Urban

Industrial

Forested

Shrubland

Grassland

Pasture

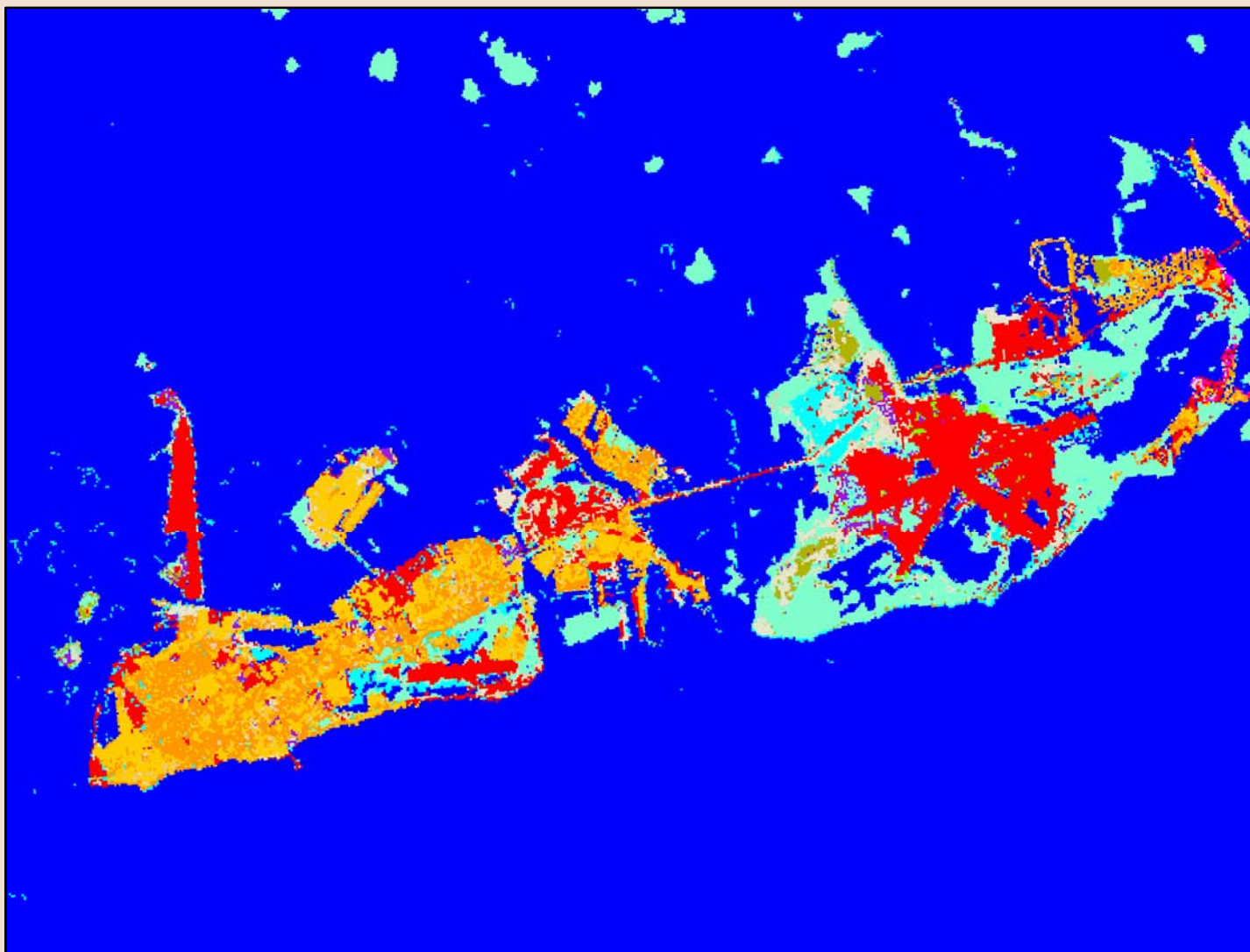
Row Crops

Wetlands

Woody

Wetlands

Water



0 1 2 4 6 Kilometers



The Dynamics of Growth

Population and coastal growth brings jobs, improves economic potential, adds new industry, enhances educational opportunities, and increases tax revenues – but it also burdens the environment.

Fifty years ago, Americans believed that ocean and coastal-related resources were infinitely available. In recent years, environmental understanding has shifted and people are more aware of the impacts of ever increasing economic development on coastal regions and their important environmental resources.





Economic and Resource Trends

Marine-related economic activity accounts for 2% of the Gross National Product. To put that in perspective, agriculture also accounts for ~2% of the GNP. Marine-related economy includes such activities as:

- 🌐 Outdoor Recreation and Tourism
- 🌐 Waterborne Commerce
- 🌐 Energy and Mineral Resources and Production
- 🌐 Fisheries Resources and Food Supply





Recreation and Tourism

Recreation and Tourism accounts for 50% of coastal economic activity.

Includes activities ranging from wildlife watching and boating-related activity to residential and commercial development.

Current growth trends occurring in coastal areas will add to this growing environmental impact.





Waterborne Commerce

US ports handle ~9 million metric tons of cargo annually.

6 of top 10 major US ports are located in the Gulf of Mexico Region (port and national rank according to tonnage, 2002):

- 🌐 Port of South Louisiana, LA (1)
- 🌐 Houston, TX (2)
- 🌐 Beaumont, TX (4)
- 🌐 New Orleans, LA (5)
- 🌐 Corpus Christi, TX (7)
- 🌐 Baton Rouge, LA (9)



The US Dept of Transportation has led a national effort that will ensure adequate port infrastructure, real-time navigation information, modern port facilities, and efficient intermodal connections.



Energy and Mineral Production

About one-fifth of the nation's oil comes from federal offshore lands.

Half of the United States consumed oil products are imported from overseas.

Offshore oil/gas leases account for the second largest source of federal income.

Deep-water oil exploration in the Gulf of Mexico is expected to house nearly 50% of the nation's remaining undiscovered oil and gas supply while offshore activity will increase 60% percent by 2010.





Fisheries Resources

Commercial and recreational fishing activities have increased to a point that we have reached the maximum capacity of our oceans and coastal waters to produce fish.

Fishery management faces an enormous challenge in achieving a sustainable fishery which can only be accomplished by putting a stop to overfishing and allowing depleted stocks to rebuild.

In 2001, Louisiana commercial landings exceeded 1 billion pounds with a dockside value of \$343 million, that accounts for approximately 27% of the total catch by weight in the lower 48 States.

Ninety-three percent of the catch in the north central Gulf is unutilized bycatch.





Environmental Quality Issues

Coastal waters are among the most productive ecosystems on earth and they are one of the most threatened.

Estuaries and coastal waters are increasingly stressed as a result of coastal population increases.

- 🌐 Point Source Pollution
- 🌐 Non-Point Source Pollution
- 🌐 Habitat Loss and Degradation





Point-Source Pollution

Two major problem areas are municipal and industrial waste discharge and ocean / coastal dumping.

Gulf coast states (Alabama, Louisiana, Mississippi and Texas) make up four of the top five US states responsible for the greatest surface water discharge of toxic chemicals.

Over the past several years, attempts have been made to control and limit the amount of point source pollution by:

- 🌐 High-level Wastewater Treatment Facilities
- 🌐 Limited Dumping of Dredged Material





Non-Point Source Pollution

Non-Point Sources pollute the environment indirectly and are mostly attributed to urban and agricultural runoff.

Contaminants include:

- 🌐 Sediments
- 🌐 Nutrients
- 🌐 Animal Wastes
- 🌐 Pesticides
- 🌐 Toxins

Most air pollution comes from human activity to power industrial processes and motor vehicles.

Population increase eventually leads to more pollution being poured into the environment.






Habitat Loss

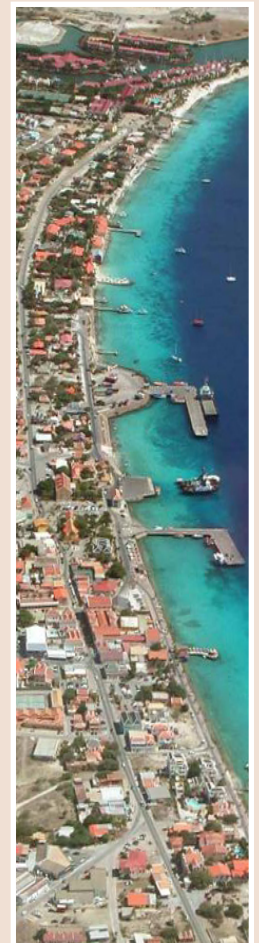
Coastal habitats have been undervalued and, until recently, have not been recognized for their importance as a coastal resource.

Sensitive and important coastal habitats within the Gulf of Mexico include:

- | | |
|--|--|
|  Wetland / Upland |  Coral Reef |
|  Dune / Beach |  Mangrove |
|  Oyster Reef |  Pond / Stream |

Anthropogenic activities have changed, degraded, or destroyed coastal habitats as well as threatened many important species occupying these habitats.

It is important to conserve these much needed resources to ensure conservation of wild species.





What is the role of science?

More specifically
“Good Science”





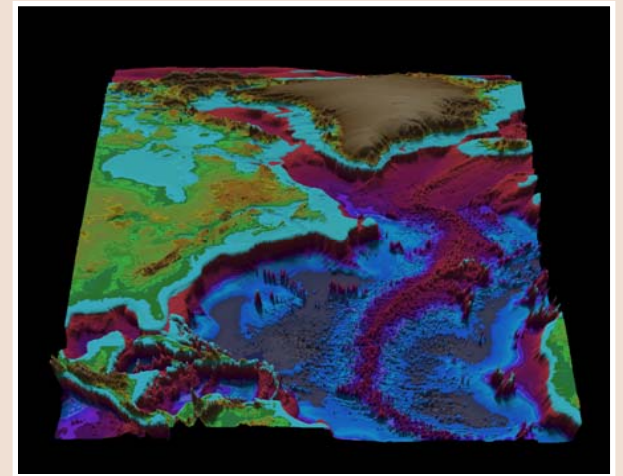
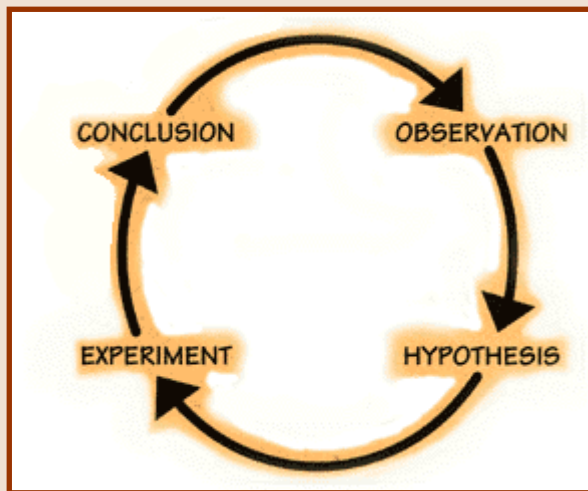
“Good Science”

Science that says what I want to hear?



“Good” Science

Science that produces
accurate facts from which truth
can be determined





Science can be impacted by:

- 🌐 Political pressure
- 🌐 Judicial pressure
- 🌐 Special interest pressure
- 🌐 Practitioner biases

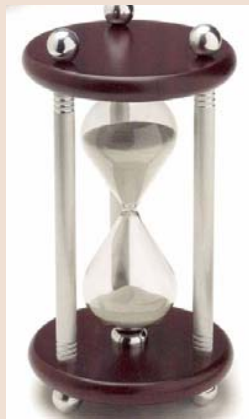






Challenges to producing Good science

- 🌐 Political
- 🌐 Economic
- 🌐 Time





Conclusions

- 🌐 Gulf of Mexico is a great place requiring great science to manage
- 🌐 Great/good science must include long-term monitoring
- 🌐 There are challenges to producing great/good science
- 🌐 The EPA is a critical player in the production of great/good science and successful management of the Gulf of Mexico